PATENT
Attorney Docket No. 401042

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

TADAO YAMAGUCHI

Application No.: Unassigned
Art Unit: Unassigned

Filed: January 29, 2001
Examiner: Unassigned

For: NON-CIRCULAR, FLAT MOTOR AND MANUFACTURING METHOD THEREOF

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE DRAWINGS

The Examiner is requested to approve the changes to Figures 1 and 7 as indicated in the attached Request for Approval of Drawing Amendments.

IN THE SPECIFICATION

Replace the paragraph beginning at page 1, line 4, with:

The present invention relates to a flat motor used as a silent alarm source in a mobile communications apparatus, and more particularly, to a non-circular, flat motor in which terminal portions are installed in dead space.

Replace the paragraph beginning at page 1, line 12, with:

A conventional cylinder type vibration motor having a diameter of 4 mm is currently being widely used. However, since the vibration motor is mounted using a holder, the actual diameter thereof becomes 5 mm, which has not kept pace with the ongoing trend in miniaturizing portable apparatus. Furthermore, the vibration motor is a narrow cylinder so that sufficient space in a radial direction for an eccentric weight installed at an output shaft cannot be secured, resulting in weak vibrations. In comparison, a flat motor having a thickness of 3 mm can be easily obtained. Also, a large space in a radial direction can be obtained. The conventional flat vibration motor is shown in FIG. 12.

Replace the paragraph beginning at page 2, line 1, with:

With a recent trend in small and light mobile communication apparatus, electric parts mounted thereon must be small and light and there is a need for parts that can be reflow soldered, a type of soldering used in automation of an assembly process. However, in the case of an apparatus using an electric part having a magnet, such as the flat motor, the magnet thermally deteriorates due to the high temperature during the process of reflow soldering. Also, it is difficult to hold the conventional motor, which is circular when viewed in a plane, with a transferring apparatus and the flexible sheet is very likely to be damaged when it is automatically mounted.

Replace the paragraph beginning at page 5, line 25, with:

FIG. 2 is a sectional view of a brushless type non-circular flat vibration motor according to a preferred embodiment of the present invention, taken along line II-II of FIG. 1;

Replace the paragraph beginning at page 6, line 3, with:

FIG. 5B is a side view of the motor of FIG. 5A viewed from the side indicated by arrow A;

Replace the paragraph beginning at page 6, line 7, with:

FIG. 6B is a side view of the motor of FIG. 6A viewed from the side indicated by arrow B;

Replace the paragraph beginning at page 6, line 11, with:

FIG. 8 is a cross sectional view of the coreless type non-circular flat vibration motor of FIG. 7 taken along line VIII-VIII of FIG. 7;

Replace the paragraph beginning at page 7, line 12, with:

FIG. 2 shows a cross section of a square-shaped, axially gapped, brushless type flat motor, taken along line II-II of FIG. 1. That is, a shaft core 1a protrudes from the center of a metal stator base 1 to which a printed circuit board is attached, and the shaft core 1a is coated with slippery resin to form a resin coated, fixed shaft 1S. A core holder 2 is integrally formed of the same resin slightly further out in the axial direction from the resin coated, fixed shaft 1S. A stator core 4 made by winding an armature coil 3 around a plurality of salient poles is welded to the core holder 2.

IN THE CLAIMS

Replace existing claims with

1. (Amended) A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing which is non-circular in a plane perpendicular to the axial direction, which rotatably supports the rotor, and which has side surfaces, at least a part of which are flat; and

a plurality of feeder terminals arranged at the side surface at corners of the housing and electrically insulated from adjacent portions of the motor.

2. (Amended) The motor as claimed in claim 1, wherein the housing includes a stator base and including an armature coil arranged at the stator base, and a magnet facing the armature coil and disposed on the rotor.

3. (Amended) The motor as claimed in claim 2, wherein the housing is substantially rectangular in the plane and at least some of the feeder terminals do not protrude outward beyond sides of the housing.

4. (Amended) The motor as claimed in claim 1, further comprising a flat magnet, a bracket as part of the housing and on which the magnet is disposed, a brush connected to the feeder terminals across a first gap between the bracket and the magnet, wherein the rotor receives electric power via the brush and faces the flat magnet across a second gap in the axial direction.

5. (Amended) The motor as claimed in claim 4, wherein a base end of the brush is part of the feeder terminal.

6. (Amended) The motor as claimed in claim 4, wherein the housing is substantially rectangular in the plane and at least some of the feeder terminals do not protrude outward beyond the corners of the housing.

7. (Amended) A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing including a stator base having a shaft for supporting the rotor centrally located on the stator base, the housing having a non-circular shape in a plane perpendicular to the axial direction, and being at least partially a resin; and

at least two feeder terminals arranged at a corner of the housing on a side surface of the housing, electrically insulating the feeder terminals from adjacent portions of the motor.

8. (Amended) The motor as claimed in claim 7, wherein the shaft has a fixed shaft core extending from a portion of the housing constituting a stator, the shaft core having a resin coating, the rotor is rotatably installed on the resin coated fixed shaft, and a tip of the shaft is inserted in a concave portion of the housing.

9. (Amended) The motor as claimed in claim 8, further comprising:

a magnetic yoke plate, the shaft core integrally protruding from the center of the magnetic yoke plate, constituting part of the housing;

a commutator;

a resin bracket including the resin coated, fixed shaft wherein the rotor includes the commutator;

a pair of brushes having a free end ends in sliding contact with the commutator and fixed such that at least two surfaces can expose base ends of the resin bracket portion through the a brush recess portion; and

an armature coil having one end connected to the commutator and rotatably arranged at the resin coated, fixed shaft, facing a magnet across a gap, wherein

the brush recess portion insulates at least one brush; and

the magnet is placed at a yoke portion of the resin bracket after the brushes are installed; and

a case accommodating the rotor and installed at the resin bracket, having a concave portion receiving the tip of the resin coated, fixed shaft at the center of the case, at least a magnetic path portion of the magnet being a magnetic body.

10. (Amended) The motor as claimed in claim 9, wherein the magnet is separated from the yoke plate by a gap to enable reflow soldering.

13. (Amended) The motor as claimed in claim 9, wherein the resin of the resin coated, fixed shaft includes potassium titanate whisker and withstands a thermal deformation temperature of over 200°C (18.5 kgf/cm^2) and is slippery.

14. (Amended) A non-circular flat brushless motor comprising:

a metal plate incorporating a shaft support at a center, forming a first part of a housing;

a fixed shaft supported by the shaft support;

a rotor rotatably installed at a tip of the fixed shaft;

a stator including a plurality of armature coils arranged around the fixed shaft to drive the rotor; and

a second part of the housing supporting the tip of the fixed shaft.

16. (Amended) The motor as claimed in claim 14, including a pinion incorporated in the rotor.

17. (Amended) The motor as claimed in claim 1, wherein the rotor is eccentric to generate vibrations during rotation.

18. (Amended) The motor as claimed in claim 7, wherein the rotor is eccentric to generate vibrations during rotation.

19. (Amended) The motor as claimed in claim 9, wherein the rotor is eccentric to generate vibrations during rotation.

20. (Amended) A method of manufacturing a non-circular flat motor having brushes, the method comprising:

pressing a lead frame having a plurality of yoke plates arranged at a predetermined pitch by a connection portion;

inserting the yoke plates in an injection mold and molding a resin bracket in the mold;

detaching at least a connection portion of the yoke plates at respective connection portions;

installing the rotor on a fixed shaft for rotating; and

installing a case.

21. (Amended) The method as claimed in claim 20, further comprising:

fixing brushes to the resin bracket by spot welding, the brushes having the same pitch as the yoke plates; and

installing a magnet on the yoke plate.

IN THE ABSTRACT

Replace the abstract with:

Abstract of the Disclosure

A non-circular flat motor in which terminal portions are installed at dead spaces and a manufacturing method. The motor can be easily held by a transferring apparatus and automatically mounted. The feeder terminal is easily reflow soldered. A rotor and a housing supporting the rotor are non-circular when in a plane perpendicular to the rotor axis. Feeder terminals or installation terminals are arranged at corners of surfaces of the housing. At least one feeder terminal is insulated from other portions of the housing. The

corners may be concave so that each of the terminals does not protrude beyond the housing. Each of the terminals is easily reflow-soldered and exposed at the side of the housing.

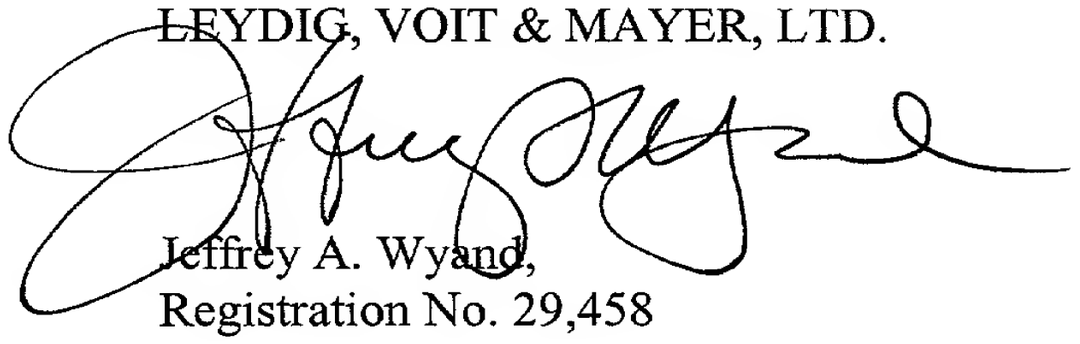
REMARKS

The foregoing changes are made to improve the form of the application. No new matter has been added and entry is respectfully requested.

A favorable Action on the merits is solicited.

Respectfully submitted,

LEYDIG, VOIT & MAYER, LTD.



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Date: January 29, 2001

JAW:cmcg

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TADAO YAMAGUCHI

Application No.:	Unassigned	Art Unit:	Unassigned
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For:	NON-CIRCULAR, FLAT MOTOR AND MANUFACTURING METHOD THEREOF		

SPECIFICATION, CLAIMS AND ABSTRACT AS PRELIMINARILY AMENDED

Amendments to the paragraph beginning at page 1, line 4:

The present invention relates to a flat motor used as a silent ~~alarming~~ alarm source in a mobile communications apparatus, and more particularly, to a non-circular, flat motor in which terminal portions are installed ~~at~~ in dead space.

Amendments to the paragraph beginning at page 1, line 12:

A conventional cylinder type vibration motor having a diameter of 4 mm is currently being widely used. However, since the vibration motor ~~should be~~ is mounted ~~by~~ using a holder, the actual diameter thereof becomes 5 mm, which ~~does~~ has not ~~keep~~ kept pace with the ongoing trend ~~to miniaturize~~ in miniaturizing portable ~~apparatuses~~ apparatus. Furthermore, the vibration motor is ~~of~~ a narrow cylinder ~~type~~ so that sufficient space in a radial direction for an eccentric weight installed at an output shaft cannot be secured, resulting in weak vibrations. In comparison, a flat motor having a thickness of 3 mm can be easily obtained. Also, a large space in a radial direction can be obtained. The conventional flat vibration motor is shown in FIG. 12.

mm can be easily obtained. Also, a large space in a radial direction can be obtained. The conventional flat vibration motor is shown in FIG. 12.

Amendments to the paragraph beginning at page 2, line 1:

With a recent trend in ~~a~~ small and light mobile communication apparatus, electric parts mounted thereon ~~becomes~~ must be small and light and there is a need for parts that can be reflow soldered, a type of soldering used in ~~the~~ automation of an assembly process. However, in the case of an apparatus using an electric part having a magnet, such as the flat motor, the magnet thermally deteriorates due to ~~a~~ the high temperature during ~~a~~ the process of reflow soldering. Also, it is difficult to hold the conventional motor, which is circular when viewed in a plane, with a transferring apparatus and the flexible sheet is very likely to be damaged when it is automatically mounted.

Amendments to the paragraph beginning at page 5, line 25:

FIG. 2 is a sectional view of a brushless type non-circular flat vibration motor according to a preferred embodiment of the present invention, taken along line ~~I-II~~ II-II of FIG. 1;

Amendments to the paragraph beginning at page 6, line 3:

FIG. 5B is a side view of the motor of FIG. 5A ~~viewing~~ viewed from the side indicated by arrow A;

Amendments to the paragraph beginning at page 6, line 7:

FIG. 6B is a side view of the motor of FIG. 6A ~~viewing~~ viewed from the side indicated by arrow B;

Amendments to the paragraph beginning at page 6, line 11:

FIG. 8 is a cross sectional view of the coreless type non-circular flat vibration motor of FIG. 7 taken along line ~~III-IV~~ VIII-VIII of FIG. 7;

Amendments to the paragraph beginning at page 7, line 12:

FIG. 2 shows a cross section of a square-shaped, axially ~~gaped~~gapped, brushless type flat motor, taken along line ~~I-II~~ II-II of FIG. 1. That is, a shaft core 1a protrudes from the center of a metal stator ~~base~~ base 1 to which a printed circuit board is attached, and the shaft core 1a is coated with slippery resin to form a resin coated, fixed shaft 1S. A core holder 2 is integrally formed of the same resin ~~to be~~ slightly further out in the axial direction from the resin coated, fixed shaft 1S. A stator core 4 made by winding an armature coil 3 around a plurality of salient poles is welded to the core holder 2.

Amendments to existing claims:

1. (Amended) A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing ~~formed to be~~ which is non-circular ~~when viewed~~ in a plane perpendicular to the axial direction, which ~~rotatabley~~ rotatably supports the rotor, and which has side surfaces, at least a part of ~~side surfaces being a~~ which are flat ~~surface~~; and

a plurality of feeder terminals arranged ~~at an angled corner~~ at the side surface at corners of the housing ~~which is formed by~~ and electrically ~~insulating all terminals of high electric potential~~ insulated from ~~other~~ adjacent portions ~~adjacent thereto~~ of the motor.

2. (Amended) The motor as claimed in claim 1, wherein the housing includes a stator base and including an armature coil ~~is~~ arranged at ~~a~~ the stator base ~~functioning as part of the housing~~, and a magnet facing the armature coil ~~is arranged at~~ and disposed on the rotor.

3. (Amended) The motor as claimed in claim 2, wherein the housing is substantially rectangular ~~when viewed~~ in ~~a~~ the plane and at least some of the feeder terminals ~~are formed~~ do not ~~to~~ protrude outward ~~over the angled corner as an angled portion for installation~~ beyond sides of the housing.

4. (Amended) The motor as claimed in claim 1, further comprising a flat magnet, a bracket as part of the housing ~~where~~ and on which the magnet is ~~arranged~~ disposed, a brush ~~incorporated with~~ connected to the feeder terminals ~~via~~ across a first gap between the bracket and the magnet, wherein the rotor receives electric power via the brush and faces the flat magnet ~~via~~ across a second gap in ~~an~~ the axial direction.

5. (Amended) The motor as claimed in claim 4, wherein a base end ~~portion~~ of the brush is ~~formed as~~ part of the feeder terminal ~~as it is~~.

6. (Amended) The motor as claimed in claim 4, wherein the housing is substantially rectangular ~~when viewed~~ in ~~a~~ the plane and at least some of the feeder terminals ~~are formed~~ do not ~~to~~ protrude outward ~~over~~ beyond the ~~angled corner as an installation portion~~ corners of the housing.

7. (Amended) A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing including a stator base having a shaft for supporting the rotor ~~provided at the center thereof and~~ centrally located on the stator base, the housing having a non-circular shape ~~when viewed~~ in a plane perpendicular to the axial direction, ~~at least some portion of the housing~~ and being ~~formed of~~ at least partially a resin; and

at least two feeder terminals arranged at ~~an angled~~ a corner ~~at the~~ of the housing on a side surface of the housing ~~which is formed by~~, electrically insulating ~~all~~ the feeder terminals ~~of high electric potential~~ from ~~other~~ adjacent portions ~~adjacent thereto~~of the motor.

8. (Amended) The motor as claimed in claim 7, wherein the shaft ~~is installed by erecting~~ has a fixed shaft core extending from ~~one~~ a portion of the housing constituting a stator ~~and coating~~, the shaft core ~~with resin to form~~ having a resin ~~coated, fixed shaft~~coating, ~~and~~ the rotor is rotatably installed ~~from a tip of~~ on the resin coated~~,~~ fixed shaft, and ~~the~~ a tip of the shaft is inserted in a concave portion ~~installed at another portion~~ of the housing.

9. (Amended) The motor as claimed in claim 8, further comprising:

a magnetic yoke plate ~~formed of a magnetic body and having~~, the shaft core integrally protruding from the center ~~thereof~~of the magnetic yoke plate, constituting part of the housing;

a commutator;

a resin bracket including the resin coated, fixed shaft wherein the rotor includes the commutator;

a pair of brushes having ~~a~~ free ~~end~~ ends in sliding contact with the commutator and fixed such that at least two surfaces can expose base ends of the resin bracket portion through ~~the~~ a brush recess portion;

~~a resin bracket portion which includes a resin coated, fixed shaft made by incorporating in the resin bracket portion at least part of the yoke plate and coating the shaft core with resin; a rotor including a commutator;~~ and

an armature coil having one end ~~portion~~ connected to the commutator and rotatably arranged at the resin coated, fixed shaft ~~to face~~, facing a magnet ~~via~~ across a gap, ~~a~~ wherein

the brush recess portion ~~formed at the yoke plate to insulate~~ insulates at least one brush; and

the magnet ~~arranged at least~~ is placed at ~~the~~ a yoke portion of the resin bracket ~~portion~~ after the brushes are ~~arranged~~installed; and

a case accommodating the rotor and installed at the resin bracket ~~by inserting a~~, having a concave portion receiving the tip of the resin coated, fixed shaft ~~in a concave portion formed~~ at the center of the case, at least a magnetic path portion of the magnet being ~~formed of~~ a magnetic body.

10. (Amended) The motor as claimed in claim 9, wherein the magnet is separated from the yoke plate by a ~~small~~ gap to enable reflow soldering.

13. (Amended) The motor as claimed in claim 9, wherein the resin of the resin coated, fixed shaft includes potassium titanate whisker and ~~has an anti-thermal feature bearing~~ withstands a thermal deformation temperature of over 200°C (18.5 kgf/cm^2) and ~~a~~ is slippery ~~feature~~.

14. (Amended) A non-circular flat brushless motor comprising:

a metal plate incorporating a shaft support ~~portion~~ at ~~the~~ a center ~~thereof~~, forming a first part of a housing;

a fixed shaft supported by the shaft support ~~portion~~;

a rotor rotatably installed at a tip of the fixed shaft ~~from a tip thereof~~; ~~and~~

a stator ~~formed of~~ including a plurality of armature coils arranged around the fixed shaft to drive the rotor~~,~~; and

~~wherein the other~~ a second part of the housing ~~supports a~~ supporting the tip of the fixed shaft.

16. (Amended) The motor as claimed in claim 14, ~~wherein~~ including a pinion ~~is~~ incorporated in the rotor.

17. (Amended) The motor as claimed in claim 1, wherein the rotor is ~~formed to be~~ eccentric to generate vibrations during rotation.

18. (Amended) The motor as claimed in claim 7, wherein the rotor is ~~formed to be~~ eccentric to generate vibrations during rotation.

19. (Amended) The motor as claimed in claim 9, wherein the rotor is ~~formed to be~~ eccentric to generate vibrations during rotation.

20. (Amended) A method of manufacturing a ~~brush type~~ non-circular flat motor having brushes, the method comprising ~~the steps of~~:

~~press~~ pressing a lead frame having a plurality of yoke plates ~~continuously installed~~ arranged at a predetermined pitch by a connection portion;

inserting the ~~continuously installed~~ yoke plates in an injection mold and ~~integrally~~ molding a resin bracket in the mold;

detaching at least ~~the~~ a connection portion of the yoke plates ~~among the~~ at respective connection portions;

installing the rotor ~~at~~ on a fixed shaft ~~to be capable of~~ for rotating; and

installing ~~the~~ a case.

21. (Amended) The method as claimed in claim ~~32~~ 20, further comprising ~~steps of~~:

fixing brushes to ~~a~~ the resin bracket by ~~a~~ spot welding ~~method~~, the brushes ~~being formed by continuously installing via a plurality of connection portions at~~ having the same pitch as the ~~predetermined pitch~~ yoke plates; and

installing a magnet ~~at~~ on the yoke plate.

Amendments to the abstract

Abstract of the Disclosure

A non-circular flat motor in which terminal portions are installed at dead ~~space~~ spaces and a manufacturing method ~~thereof are disclosed~~. ~~Since a flexible sheet type feeder terminal is not adopted, the~~ The motor can be easily held by a transferring apparatus and automatically mounted. ~~Also, the~~ The feeder terminal ~~has solderability and~~ is ~~easy to be reflow-soldered~~ easily reflow soldered. A rotor and a housing supporting the rotor are ~~formed to be~~ non-circular when ~~viewed~~ in a plane perpendicular to the rotor axis. Feeder terminals or installation terminals are arranged at ~~corner portions at the side~~ corners of surfaces of the housing ~~which are angled and using a circle as an inscribed circle~~. At least one feeder terminal ~~of a high electric potential~~ is insulated from ~~the~~ other

~~portion~~portions of the housing. The~~ corner portion is formed to~~ corners may be concave so that each of the terminals~~ is prevented from protruding outward from~~ does not protrude beyond the housing. Each of the terminals~~ are bent to be~~ is easily reflow-soldered and exposed~~ to~~ at the side of the housing.

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Attorney Docket No. 401042

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

TADAO YAMAGUCHI

Application No.:	Unassigned	Art Unit:	Unassigned
Filed:	January 29, 2001	Examiner:	Unassigned
For:	NON-CIRCULAR, FLAT MOTOR AND MANUFACTURING METHOD THEREOF		

CLAIMS PENDING AFTER PRELIMINARY AMENDMENT

1. A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing which is non-circular in a plane perpendicular to the axial direction, which rotatably supports the rotor, and which has side surfaces, at least a part of which are flat; and

a plurality of feeder terminals arranged at the side surface at corners of the housing and electrically insulated from adjacent portions of the motor.

2. The motor as claimed in claim 1, wherein the housing includes a stator base and including an armature coil arranged at the stator base, and a magnet facing the armature coil and disposed on the rotor.

3. The motor as claimed in claim 2, wherein the housing is substantially rectangular in the plane and at least some of the feeder terminals do not protrude outward beyond sides of the housing.

4. The motor as claimed in claim 1, further comprising a flat magnet, a bracket as part of the housing and on which the magnet is disposed, a brush connected to the feeder

4. The motor as claimed in claim 1, further comprising a flat magnet, a bracket as part of the housing and on which the magnet is disposed, a brush connected to the feeder terminals across a first gap between the bracket and the magnet, wherein the rotor receives electric power via the brush and faces the flat magnet across a second gap in the axial direction.

5. The motor as claimed in claim 4, wherein a base end of the brush is part of the feeder terminal.

6. The motor as claimed in claim 4, wherein the housing is substantially rectangular in the plane and at least some of the feeder terminals do not protrude outward beyond the corners of the housing.

7. A non-circular flat motor comprising:

a rotor rotating about an axis aligned in an axial direction;

a housing including a stator base having a shaft for supporting the rotor centrally located on the stator base, the housing having a non-circular shape in a plane perpendicular to the axial direction, and being at least partially a resin; and

at least two feeder terminals arranged at a corner of the housing on a side surface of the housing, electrically insulating the feeder terminals from adjacent portions of the motor.

8. The motor as claimed in claim 7, wherein the shaft has a fixed shaft core extending from a portion of the housing constituting a stator, the shaft core having a resin coating, the rotor is rotatably installed on the resin coated fixed shaft, and a tip of the shaft is inserted in a concave portion of the housing.

9. The motor as claimed in claim 8, further comprising:

a magnetic yoke plate, the shaft core integrally protruding from the center of the magnetic yoke plate, constituting part of the housing;

a commutator;

a resin bracket including the resin coated, fixed shaft wherein the rotor includes the commutator;

a pair of brushes having free ends in sliding contact with the commutator and fixed such that at least two surfaces can expose base ends of the resin bracket portion through a brush recess portion;

and

an armature coil having one end connected to the commutator and rotatably arranged at the resin coated, fixed shaft, facing a magnet across a gap, wherein

the brush recess portion insulates at least one brush; and

the magnet is placed at a yoke portion of the resin bracket after the brushes are installed; and

a case accommodating the rotor and installed at the resin bracket, having a concave portion receiving the tip of the resin coated, fixed shaft at the center of the case, at least a magnetic path portion of the magnet being a magnetic body.

10. The motor as claimed in claim 9, wherein the magnet is separated from the yoke plate by a gap to enable reflow soldering.

11. The motor as claimed in claim 10, wherein the yoke plate is separated from the case except for a combined portion.

12. The motor as claimed in claim 11, wherein a portion for reflow soldering is not close to the combined portion.

13. The motor as claimed in claim 9, wherein the resin of the resin coated, fixed shaft includes potassium titanate whisker and withstands a thermal deformation temperature of over 200°C (18.5 kgf/cm^2) and is slippery.

14. A non-circular flat brushless motor comprising:

a metal plate incorporating a shaft support at a center, forming a first part of a housing;

a fixed shaft supported by the shaft support;

a rotor rotatably installed at a tip of the fixed shaft;

a stator including a plurality of armature coils arranged around the fixed shaft to drive the rotor; and

a second part of the housing supporting the tip of the fixed shaft.

15. The motor as claimed in claim 14, wherein the fixed shaft has a shaft core cut from a metal plate and the shaft core is coated with resin.

16. The motor as claimed in claim 14, including a pinion incorporated in the rotor.

17. The motor as claimed in claim 1, wherein the rotor is eccentric to generate vibrations during rotation.

18. The motor as claimed in claim 7, wherein the rotor is eccentric to generate vibrations during rotation.

19. The motor as claimed in claim 9, wherein the rotor is eccentric to generate vibrations during rotation.

20. A method of manufacturing a non-circular flat motor having brushes, the method comprising:

pressing a lead frame having a plurality of yoke plates arranged at a predetermined pitch by a connection portion;

inserting the yoke plates in an injection mold and molding a resin bracket in the mold;

detaching at least a connection portion of the yoke plates at respective connection portions;

installing the rotor on a fixed shaft for rotating; and

installing a case.

21. The method as claimed in claim 20, further comprising:

fixing brushes to the resin bracket by spot welding, the brushes having the same pitch as the yoke plates; and

installing a magnet on the yoke plate.

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Application No.: Unassigned | Art Unit: Unassigned

Filed: January 29, 2001 | Examiner: Unassigned

For: NON-CIRCULAR, FLAT MOTOR AND MANUFACTURING METHOD THEREOF

REQUEST FOR APPROVAL OF DRAWING AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

The Examiner is requested to approve the changes indicated in red on the attached copies of Figures 1 and 7

Respectfully submitted,

LEYDIG, VOIT & MAYER, LTD.

Jeffrey A. Wyand,
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Date: January 29, 2001
JAW:cmcg

FIG. 1

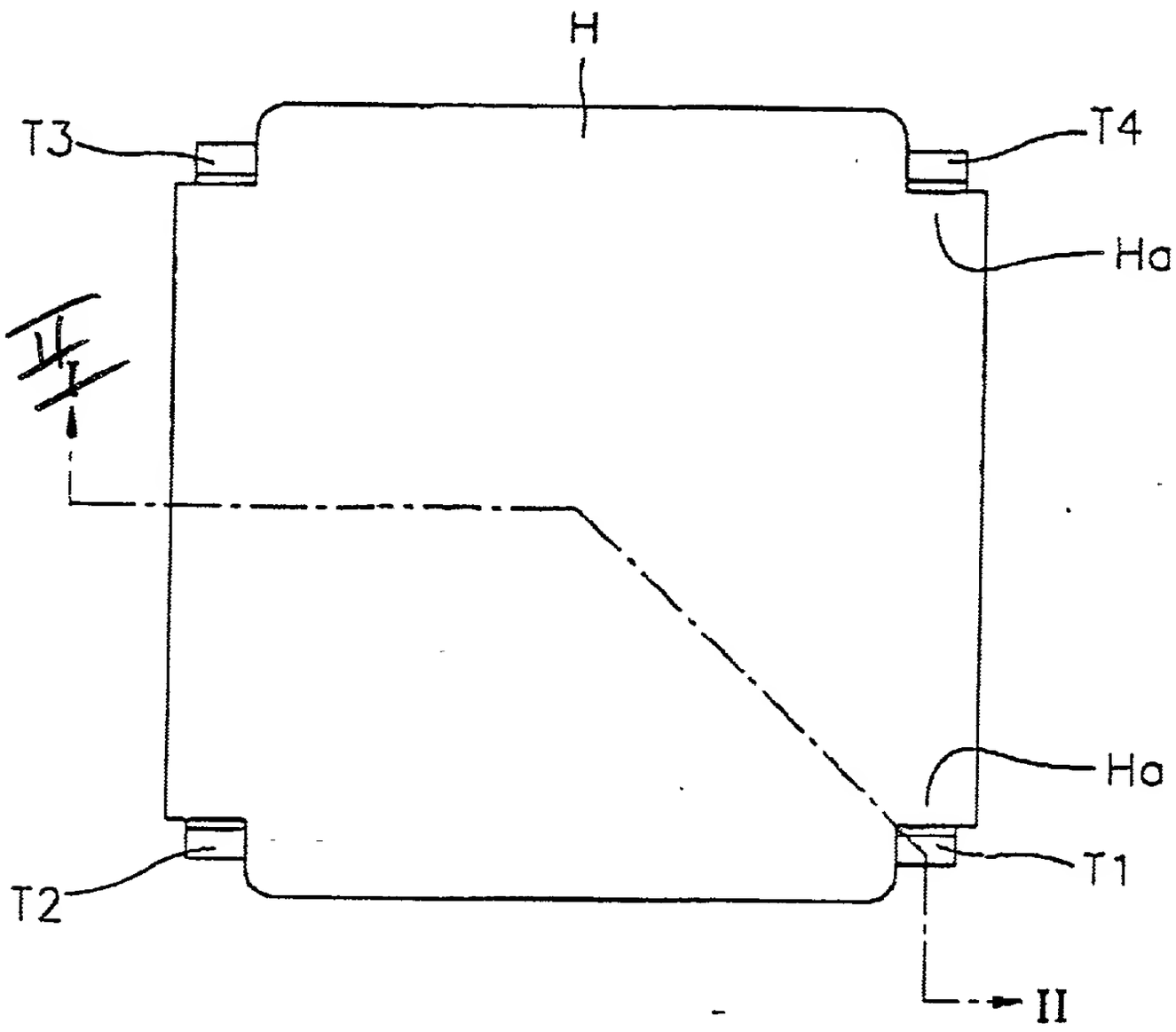


FIG. 2

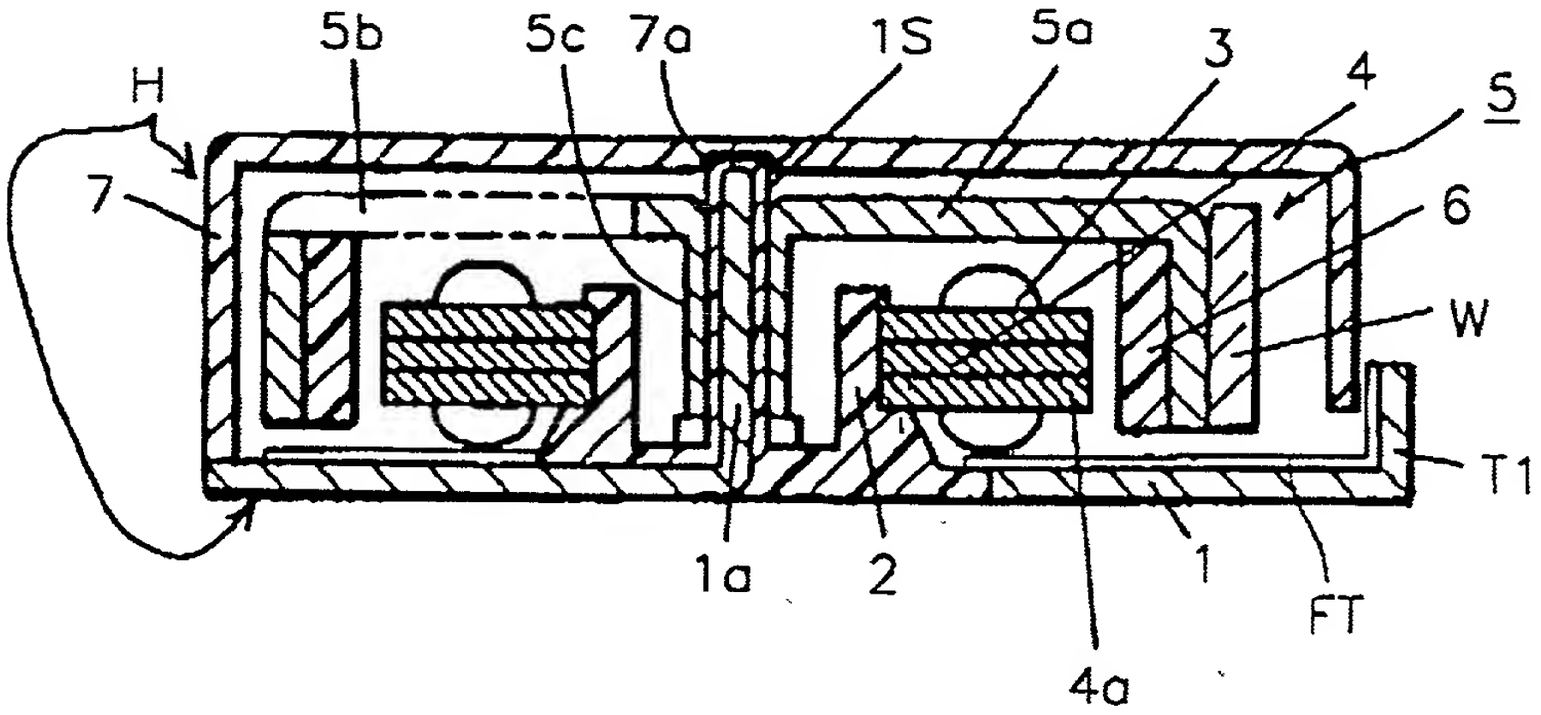
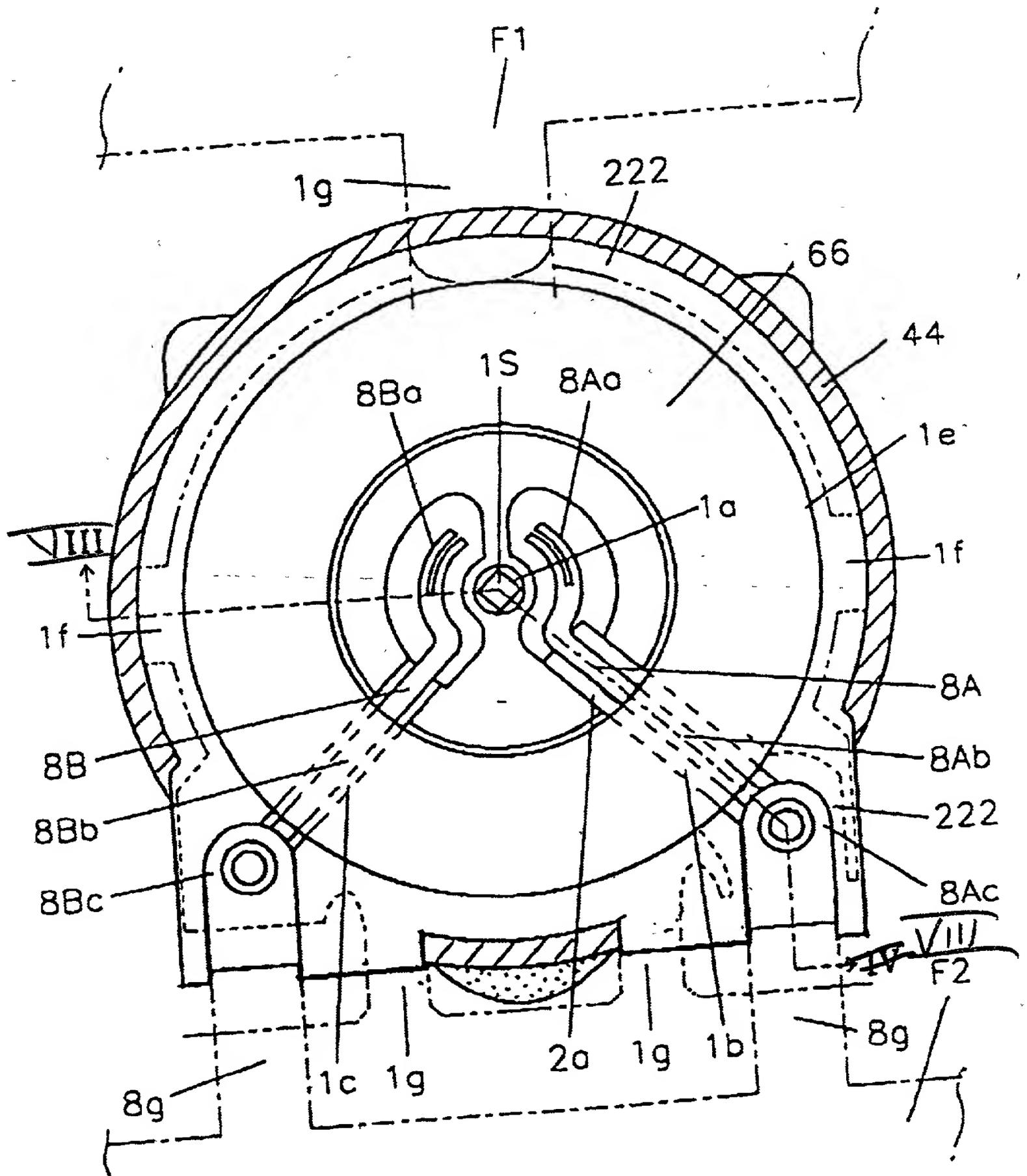


FIG. 7


F1
1g
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1S
8Ao
8Bo
1e
1a
1f
VIII
1f
8A
8B
8Ab
8Bb
222
8Bc
8Ac
IV
VIII
F2
8g
2a
1g
1b
1c
1g
8g